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The Walmart Sustainability Case Project

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Walmart's Sustainability Journey: Bottled Water Logistics and Forecasting

Eric Smith, regional supply chain manager for Walmart, walked down a concrete aisle between towering shelves of products and pallets. It was a hot day in July 2010, and Smith had made the trip to the backroom of a Conway, Arkansas, Walmart Supercenter to think about water—bottled water, to be specific. The inventory levels had been piling up at an alarming rate at the regional distribution center (DC) in Clarksville, Arkansas, apparently as a result of some overly optimistic forecasting of demand over the July 4 holiday. Smith soon found what he was looking for: a vast section of storage shelves densely packed with pallets of bottled water, ranging from single-serve, 10-ounce bottles to 2.5-gallon jugs. For a moment, he contemplated the sheer volume, not to mention weight, of the liquid before him. He recalled that a single cubic foot of water weighed 62 pounds. Could that be right? How much could these shelves hold?

Smith's reflections were interrupted by unusual sounds coming from the aisle to his left. Investigating, he found an associate disposing of 12-packs of small Sam's Choice water bottles that had been damaged while being unloaded and moved around the warehouse by forklift. She worked methodically, first pouring the water into a drain and then feeding the cardboard and plastic into a shredder for recycling. Smith's brow furrowed. This stuff is not cheap to transport, and apparently storage and handling present problems as well. As he watched costs literally pour down the drain, his thoughts moved to waste: wasted production, wasted transportation, and wasted resources. The scene in front of him seemed directly contradictory with Walmart's sustainability goals. And beyond the strategic implications, Smith had to wonder how the

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perpetual inventory system even recorded this reduction in inventory. Was it recorded at all? It appeared to be time to get smarter about water at Walmart.

Bottled Water

Water in a plastic bottle might not be the most exciting product category, but sales of bottled water have registered nearly continuous growth for more than three decades. The idea of bottling water began in Europe in the 1700s, when mineral spring water was bottled and sold for its reputed healing properties. In the early twentieth century, bottled water in Europe offered a safe alternative to unsanitary tap water in many areas. Bottled water entered the U.S. market much later; sanitization of public water had been available there since early in the twentieth century. But consumption of bottled water in the United States saw rapid increases in the 1990s and 2000s, rising from 9.8 gallons per person in 1992[i] to 27.6 gallons per person in 2009.[ii] Overall, consumption of bottled water grew a thousand-fold between 1984 and 2005.[iii] The drivers of this increase were numerous and varied: an aging municipal water infrastructure; a perception that bottled water was safer and tasted better than tap water;[iv] and greater mobility that required convenient, portable water delivery methods. Another important growth driver was the increased focus on healthy diet and lifestyle choices, in which proper hydration and avoidance of sugary drinks both play important roles. People who consume bottled water regularly are twice as likely to cite health concerns as a factor in their beverage choices than those who do not. Furthermore, the increase in bottled water consumption was accompanied by a greater share of households using water filters at home.

Overall, water made up 41% of the beverages Americans consume, and bottled water constituted nearly one-third of total water consumption.[v] Studies showed that bottled water drinkers were disproportionately from ethnic minorities and had higher-than-average levels of education. Furthermore, though bottled water often was compared to tap water, only 30% of its consumers said they would drink tap water if bottled water were not available; the others would choose some other bottled beverage. Thus the market that featured bottled water also included carbonated soft drinks, sports drinks, juices, coffee, milk, and beer. In this category, bottled water had gained ground against all its competitors, especially soft drinks. Between 2000 and 2009, bottled water's market share increased from 9% to 14.5%, while soft drinks fell from 30% to 24%. During the economic downturn that began in 2008, sales of nearly all beverages decreased, but bottled water sales decreased less than those of all other beverage categories.

Bottled water sold in many sizes and formats, bottled in both glass and various types of plastic bottles, but 70% of water sold in the United States used a "single-serve" format and came in polyethylene terephthalate (PET) plastic bottles. Bottled water also can be classified into several subcategories, such as carbonated, mineral, artesian, spring, purified, and deionized. None of these varieties include flavorings as such, though added minerals can enhance flavor. Water comes from various sources or goes through several processes, depending on its labeling. The most common label is pure or purified water. Purified water may be from any acceptable source, including springs or municipal sources, but the dissolved solids must be removed from it using distillation or reverse osmosis. Spring water comes from underground and rises to the surface without active extraction. Mineral water may be from any source but contains a minimum level of minerals. Regardless of the source, all bottled water must be sanitized and filtered.

Recent trends indicated consumers prefer packages of multiple, smaller bottles rather than single, larger bottles, so the fastest growing product category is 12- and 24-packs of single-serve, 10 fluid ounce (237 ml) bottles. Walmart's private label water brands, Sam's Choice and Great Value, sold in such packs, were bottled in five locations in North America (Quebec, Florida, Texas, and two West Virginia sites), and competed primarily on price.

Walmart and Sustainability

"We didn't get where we are today by being like everyone else and driving the middle of the road," said Lee Scott, CEO of Walmart, in 2005. "We became Walmart by being different, radically different."[vi] The radical difference Scott proposed that day was sustainability leadership, committing the company to be supplied by 100% renewable energy, to produce zero waste, and to sell products that not only sustained communities but also protected the environment. He gave no timelines for achieving those goals, and admitted he didn't know exactly how to achieve them. But the environment was being degraded by human activity, which was hurting people—"Katrina in slow motion," Scott called it, referring to the devastating 2005 hurricane—and people involved in business had an opportunity and the responsibility to eliminate this negative impact.

In retrospect, the speech and emphasis on sustainability came to be regarded as a significant change for Walmart, yet Scott couched it as a continuation of Walmart's longstanding principle of finding business opportunities in unlikely places. At Walmart's founding in 1962, founder

Sam Walton chose to place stores in small towns in the Midwestern and southern United States, even as most retail enterprises were focusing on large cities. Walmart challenged the conventional wisdom by establishing a highly centralized system of store-level planning, and by 1987, it had completed the installation of the largest private satellite network in the world, connecting every store with its home offices in Bentonville, Arkansas.[vii] The company also challenged a traditional model of outsourced transportation services, establishing its own trucking fleet in the late 1970s in response to the high rates charged by trucking companies to deliver to stores in small towns.[viii]

Walton's innovative thinking resulted in explosive growth for his company. By 1996 Walmart had a presence in all 50 U.S. states and five countries, including China. In 1999, with 1.1 million employees, Walmart became the world's largest private employer. Scott considered Walmart's size both a challenge and an opportunity: "We are in uncharted territory," he noted. "If we were a country, we would be the 20th largest in world.… Due to our size and scope, we are uniquely positioned to have great success and impact in the world, perhaps like no company before us."

In other contexts, Scott made the case that sustainability was not just another task on a to-do list but rather a lens through which to see the world and business.[ix] This led the company to rethink the role of consumers in achieving sustainability. For instance, Walmart actively influenced customers' light bulb purchasing decisions, directing them toward more expensive compact fluorescent bulbs and away from cheaper, energy-intensive incandescent bulbs.[x] Sustainability was not a philanthropic add-on but a new way of doing business that could also ensure additional profits for the company. For example, waste is both an economic loss and an environmental hazard, and thus Walmart would focus on waste reduction strategies. In particular, Scott emphasized supply chain waste and pollution:

> If there is waste or pollution, someone along the line pays for it. For example, if our trucks are inefficient from a fuel standpoint, we'll pay for that at the diesel pump. If the dumpsters behind our stores fill up with trash, you can be assured that we paid someone to send that trash to us, and we will pay someone to take it away. [xi]

Sustainability and Bottled Water

When *The Wall Street Journal* asked Lee Scott where to draw a line—sell a product with a high environmental cost or not offer it—he had a ready answer: "If the customer wants bottled water,

we are going to sell bottled water. But even if you're going to sell bottled water, you can sell it and have less of a negative impact." And indeed, the negative impact of bottled water on the environment has long been the subject of active discussions among business leaders and environmentalists. A 2007 *Fast Company* article brought the issue to the forefront, framing the decision to drink bottled water as one with deep ethical implications. For instance, Fiji Water produced more than a million bottles of water a day, yet more than half the people on the island of Fiji did not have reliable, safe drinking water. [xii] Water bottlers acted quickly to defend themselves and establish their sustainability credentials. Still, consumers and watchdog groups remained skeptical. One group, commenting on the controversial Fiji Water product (bottled on the remote Pacific island and shipped to locations worldwide), asserted:

> The fact that a product that comes packaged in plastic and is shipped thousands of miles from its source of origin could claim the mantle of sustainability is dubious at best…. While we appreciate Fiji Water's attempt to mitigate the negative environmental impacts of their water operation, the fact remains that the only truly sustainable water is the kind that requires no fancy packaging or clever marketing gimmicks: tap water.[xiii]

The quality of bottled water was also questioned, and sometimes even bottled water representatives were unable to distinguish their products from competitors.[xiv] A market-based study conducted by an advocacy NGO, Environmental Working Group, indicated that bottled water contained contaminants at levels no different than routinely found in tap water, noting,

> Several Sam's Choice samples purchased in California exceeded legal limits for bottled water contaminants in that state. Cancer-causing contaminants in bottled water purchased in 5 states (North Carolina, California, Virginia, Delaware and Maryland) and the District of Columbia substantially exceeded the voluntary standards established by the bottled water industry.[xv]

In terms of packaging, though PET plastics are highly recyclable and can be converted into products like carpeting, fleece clothing, and playground equipment, as well as new containers and bottles, in 2008 only about 13% of plastic bottles ended up in the U.S. recycling stream. Approximately 2 million tons of water bottles instead moved to landfills.[xvi] Not only would these plastic bottles take centuries to decompose, but they cannot be incinerated, because burning them releases toxic chlorine gas into the atmosphere and produces ash containing heavy metals. The NRDC also estimated greenhouse effects related to transportation: In 2006, the 18 million gallons of bottled water shipped from Fiji to California produced about 2,500 tons of CO_2.[xvii] According to a 2007 resolution passed by the U.S. Conference of Mayors, plastic water bottles

produced for U.S. consumption require 1.5 million barrels of oil per year, which might otherwise power 250,000 homes or fuel 100,000 cars for a year.[xviii]

Even as these debates raged, consumer demand for bottled water remained and, as Lee Scott acknowledged, was unlikely to dissipate anytime soon. Rather, the consensus view suggested that bottled water would continue to steal market share from other beverages. For Eric Smith, this market status meant that improving Walmart's bottled water inventories was critical. The problem was clear in his mind: Forecasting bottled water demand was simply not good enough, and an investment in improving its forecasting could pay huge dividends for Walmart, both financially and environmentally.

Thus when Smith returned to his office later that day, he immediately called Shirley Thomas, director of merchandise replenishment, to ask if they could form a team to assess and improve Walmart's bottled water forecasting process. Thomas agreed that the waste associated with bottled water was out of line with the company's sustainability goals, but she was skeptical that improved forecasting was the solution. Considering Smith's strong arguments though, she agreed to help him with the project.

Forecasting Bottled Water Sales

The very next day, Smith got started by talking with store and DC managers about their experiences with bottled water inventories. Because most sales involved single-serve containers (or multi-packs of single-serve containers), he decided to focus on such products. As he had anticipated, most of the conversations revolved around problems of excess inventories on the one hand but stockouts on the other, especially around special events such as July 4 or major sporting events. Year after year, demand during these special occasions got dramatically overestimated or underestimated. The result was a quantity of bottles on hand that was either far in excess of what was needed or not nearly enough. Although bottled water has a long shelf life and is unlikely to expire, excess bottles tie up capital, occupy valuable storage space, and offer the potential for damage as they wait to work through excess supply. The sound of water from damaged bottles being poured down the drain still rang in Smith's ears.

Of course, underestimating demand had significant consequences too. For many shoppers, the appeal of Walmart is its offer of a one-stop shop, with a wide array of products: groceries,

general merchandise, apparel, pharmacy, and so on. Walmart shoppers thus expect products to be on the shelves. Stockouts at the store level might be resolved through interstore transshipments to address the shortfall, but this process is highly inefficient. Replacement products also might be coming on the next truck headed for the store from the DC, but this delivery might not occur for several days—or more, if the truck did not have any excess space to load the water. From a sustainability standpoint, stockouts also waste customers' fuel and time, because they must travel to another store to complete their purchases. Inventory mistakes, whether they are excess stock or shortages, thus are costly in various ways.

One of Smith's bottled water conversations with Rudy Valendorf, the Director of Merchandise Replenishment, was particularly insightful, so it is reproduced at length here:

> VALENDORF: I'm concerned that we're throwing ourselves at a brick wall. Bottled water is very costly to move, in terms of money and energy use, not to mention pollution from bottle production. Besides, it may not be any better for consumers than plain tap water. Why are we trying to improve the sustainability of the supply chain of a product if the product is fundamentally unsustainable? It seems disingenuous.
>
> SMITH: If the bottled water were being substituted for tap water at home, then I would agree with you. However, much of it is being purchased as a substitute for other drinks, including colas and even beer, in some cases. You could argue that providing bottled water as an alternative is socially responsible. Instead of purchasing a bottle of orange soda, some people are purchasing a bottle of water. If our customers wanted tap water they would get it at home; hey, they could even get it from the faucets in our bathrooms at no cost to them!
>
> VALENDORF: But can we really say that one product is sustainable just because it is not as bad as another? The transportation and demand challenges with water exist in soft drinks, too. Besides, bottled water already costs the consumer less than bottled soft drinks. As things lie, there is already an incentive for the consumer to buy bottled water over other alternatives because it costs less and is more healthful than are soft drinks, but the environmental costs in terms of energy and resource consumption and the challenges related to waste are the same.
>
> SMITH: My point exactly! Both are fast-moving consumer goods with similar demand patterns and a similar supply chain, but one costs less and is better for the consumer than the other. They both have an environmental cost, and that cost for water is being exacerbated by our distribution. So we have an obligation to improve the bottled water supply chain because it is the best alternative, and because small improvements can make a big difference, in terms of our costs as well as our environmental impact.
>
> VALENDORF: Sure. But I still have my doubts. Besides, I'm sure that consumer advocacy and environmental groups are going to start talking about

"greenwashing," saying that we're just painting a sustainability façade on an unsustainable product.

SMITH: First of all, we're not planning on changing the labeling or advertising, so we're not trying to convince people that drinking bottled water is an environmentally friendly activity. We're just trying to make this product friendlier to the environment. The thing is that we aren't going to stop people from buying bottled water. If we stopped selling bottled water altogether, they would either buy a less healthy alternative from us or they would go to a competitor to get it. We're a big company, and we can influence the market but we can't fight it. We've got to find a way to make what people are buying more sustainable. The way I see it we can either try to convince people to buy something else, or we can find ways to make the supply chain for what they are already buying more sustainable. Convincing people to buy something else is tricky. We could end up spending a lot of time, energy, and money and have it fail. On the other hand we already know there are significant opportunities in the supply chain. I think that's where the best opportunity is.

VALENDORF: Alright. I'll buy it. Where do you think we should start?

SMITH: I think there are two ways to approach this. One would be to fine-tune the supply, to improve forecasting and distribution. The other would be to look at how the supply chain could be restructured to make it more flexible or reduce overall transportation costs.

VALENDORF: I think that to make real improvements in the sustainability of bottled water, we have to design a better supply chain. There has to be a more efficient form of storing and delivering all these bottles.

SMITH: It would be great if you were right! Personally, I prefer to scratch where it itches. The excessive inventory starts when forecasts higher than actual demand. Why don't we split up and you can look into our possibilities in re-designing the product supply chain and I'll see what we can do about improving our forecasting?

VALENDORF: Sounds like a plan!

Chasing the Bottle

Valendorf was serious, and so he set out to become an expert in the bottled water supply chain. As he learned more, he began to note various inefficiencies that might yield opportunities for improvement. In terms of consumer products, bottled water is simple to produce. It begins before the bottle, with a "preform." Preforms consist of the PET plastic for a bottle, condensed into a small capsule. Single-serve preforms and bottles, which average about 9 grams each, get shipped to bottling facilities, where they are "blown" or expanded using machines that blow hot air into the perform, forcing it to take to the shape of a mold.

Sam's Choice and Great Value water was purified, bottled, and packaged at five locations in the eastern and south-central United States, then shipped by truck to DCs. As a product, bottled water was a transportation challenge: Water is dense, so trucks reach their maximum payload ("weigh out") well before filling all the volume of space in the truck ("cube out"). After expansion, a 10 fl. oz. bottle weighs approximately 246 grams (8.7 oz.), and a 12-pack weighs 3,450 grams (7.6 lbs.). Depending on its configuration, a pallet of 12-packs of 10 oz. water bottles would weigh between 607.5 kg (1,338 lbs.) and 752.4 kg (1,657 lbs.), and they cannot be stacked without crushing the plastic bottles. Thus, dry vans weigh out with 18 pallets, which would leave room (but not weight capacity) for 12 more pallets. In other words, for every five trucks transporting bottled water, Walmart was transporting the equivalent of two empty trucks. Then, from the DCs, bottled water moved in mixed product trucks to stores. After consumption, most bottles wound up in landfills.

The simplest opportunity Valendorf noticed for improving the efficiency of the bottled water distribution was readjusting the pallet configuration. He began to play around with various configurations of 12-packs on the pallet (Exhibit 1). In some configurations, the bottles hung over the edge, which would likely lead to waste through damage, though Valendorf was unsure how much. As he developed different configurations, Valendorf also found ways to approach the trucks' weight capacity using configurations that did not require any products to hang over the edge of the pallet. When he calculated the number of bottles per load though, he discovered that the current configuration held 71,280 bottles, and his new idea would increase that number to 72,900—an improvement of only about 2.2%. Although any improvement was welcome, 2.2% was not the earth-shattering change he hoped to achieve.

He considered some more. Perhaps the purified water could be bottled in the DC; it could come from any source, including municipal tap water. He looked into the costs: If Walmart started purifying and bottling tap water at each DC; it would need to purchase machinery to blow the preforms, purify the water, and fill the bottles (Exhibit 2). His calculations led Valendorf to conclude that this reorganization of the supply chain was the best choice—maybe not for all the water categories perhaps, but certainly for simple purified water. Excited, he took his idea to Smith: "This way we could limit the negative impacts of the forecasting variations, by taking a step out of the supply chain. We would have a 36% reduction in transportation miles. This is a much more environmentally friendly supply chain."

But Smith was unsure. "Well," he worried:

> We would eliminate transportation to the DC for that SKU, but what about the unintended consequences? If we take our highest volume product away from our bottlers, how will they react? How will it affect the efficiency of the other products? How will it affect our forecasting accuracy of those products? I think it's a good system for eliminating transportation waste, but I'm not sure that it won't hurt the bottom line overall. We should at least see what the breakeven point would be on all that equipment investment that would be required. And while I think that the new pallet configuration is good, remember that we currently use CHEP pallets, which are standardized and recycled through the supply chain. If we make customized pallets, the total system might be less efficient.

"You raise some good points," said Valendorf. "Sounds like we need to sit down and consider the impact of these potential changes more carefully. What have you found on the forecasting side?"

Forecasting

Smith knew that Walmart had a powerful tool to improve its forecasting: its wealth of point-of-sale (POS) data. He could use these data to improve forecasting for bottled water, but where should he begin? With so many forecasting methodologies out there, which would make the most sense in this case? Should forecasting be done at the store level and then rolled up to the DCs? Or should it be done at the DC and then somehow allocated to the stores? One thing was clear though: If he could make even a small improvement in this area, the implications for Walmart, both financial and environmental, would be dramatic.

Store and DC replenishment both require forecasts. Most replenishment systems use time-series forecasting methods, which assume an underlying demand pattern. The goal of time-series methods is to see through any noise (e.g., random fluctuations in sales) to determine the underlying pattern, which should include trends and/or seasonality in demand. In discussions with Shirley Thomas, Smith considered the various ways to approach forecasting models. For example, should the model would be top-down or bottom-up? "A top-down model looks at the total demand for all the stores or DCs in the account in consideration and uses that forecast to develop an order, then breaks that demand up into its parts for shipping," Thomas explained. "A bottom-up model estimates demand for each destination and sums all those individual demands to build a forecast for production." "But, which one is best?" Smith asked.

THOMAS: It depends in part on bullwhip. The bullwhip effect describes how fluctuations in demand are amplified as you move upstream in the supply chain. Moderate ups and downs in consumer demand are slightly exaggerated in store orders, which are further exaggerated in DC orders.

SMITH: Aha! Then our problem is that the bullwhip is cracking every holiday in the stores, and that's generating some serious waste in the supply chain.

THOMAS: Exactly. But remember not every aspect of the bullwhip effect is random or even faulty. Orders are placed to maximize transportation efficiency or in accordance with other constraints. So sometimes the variation is generated intentionally at the store or DC level, which means that if you only pay attention to POS data you could be missing meaningful variation. But the rules about POS versus orders data and top-down and bottom-up forecasts are only general guidelines, and specific products can act differently.

SMITH: How so?

THOMAS: For instance, products with a high rate of sale usually are appropriate for POS-based forecasting. However, if a product has a high bullwhip effect, POS-based forecasts decrease in accuracy. Also, if the product moves through a lot of non-turn volume, such as through special displays or promotions, that decreases the accuracy of POS-based forecasts. And if a product has seasonal demand, it further confounds short-term forecasts based on POS data.

SMITH: But that just begs more questions! In water, we have a fast-moving consumer good, so it should be right for bottom-up POS-data forecasting. But it may have some bullwhip effect, I know it has a lot of non-turn volume, and I know it's seasonal, though I'm not sure to what extent.

THOMAS: Well, I never said forecasting was going to be easy. But I think we can get a handle on this issue if we dive into the POS data we have. It will help us define all those parameters. But we need to keep in mind that our problem is not just mathematical. Psychology and human error are involved, and whatever solutions we find, we'll have to be able to sell them to the store and DC managers.

SMITH: Time-series methods are easy to automate and easy to understand, and that is why they are used. Certainly bottled water has trend and seasonal components. But we also know that there are other factors that cause changes in demand for bottled water, such as weather conditions. Like you say, we're going to have to take a much closer look at the data.

Questions to Consider

1. Given its aggressive sustainability mission, does it make sense for Walmart to be in the business of selling bottled water? Why or why not?
2. What are the business implications of overestimating demand? What about underestimating demand? Which of the two is more problematic for a manager? Does your answer change at different echelons of the supply chain (e.g., DC vs. store)? How?
3. Should Walmart start bottling its Sam's Choice and Great Value water at the DCs? What are the pros and cons of this decision?
4. Will the pallet redesign suggested by Valendorf have a positive environmental impact? What factors need to be considered in this decision?
5. What causal factors explain the most variation in bottled water sales in the past?
6. What time-series methods seem to perform best for predicting bottled water sales?

Exhibit 1.

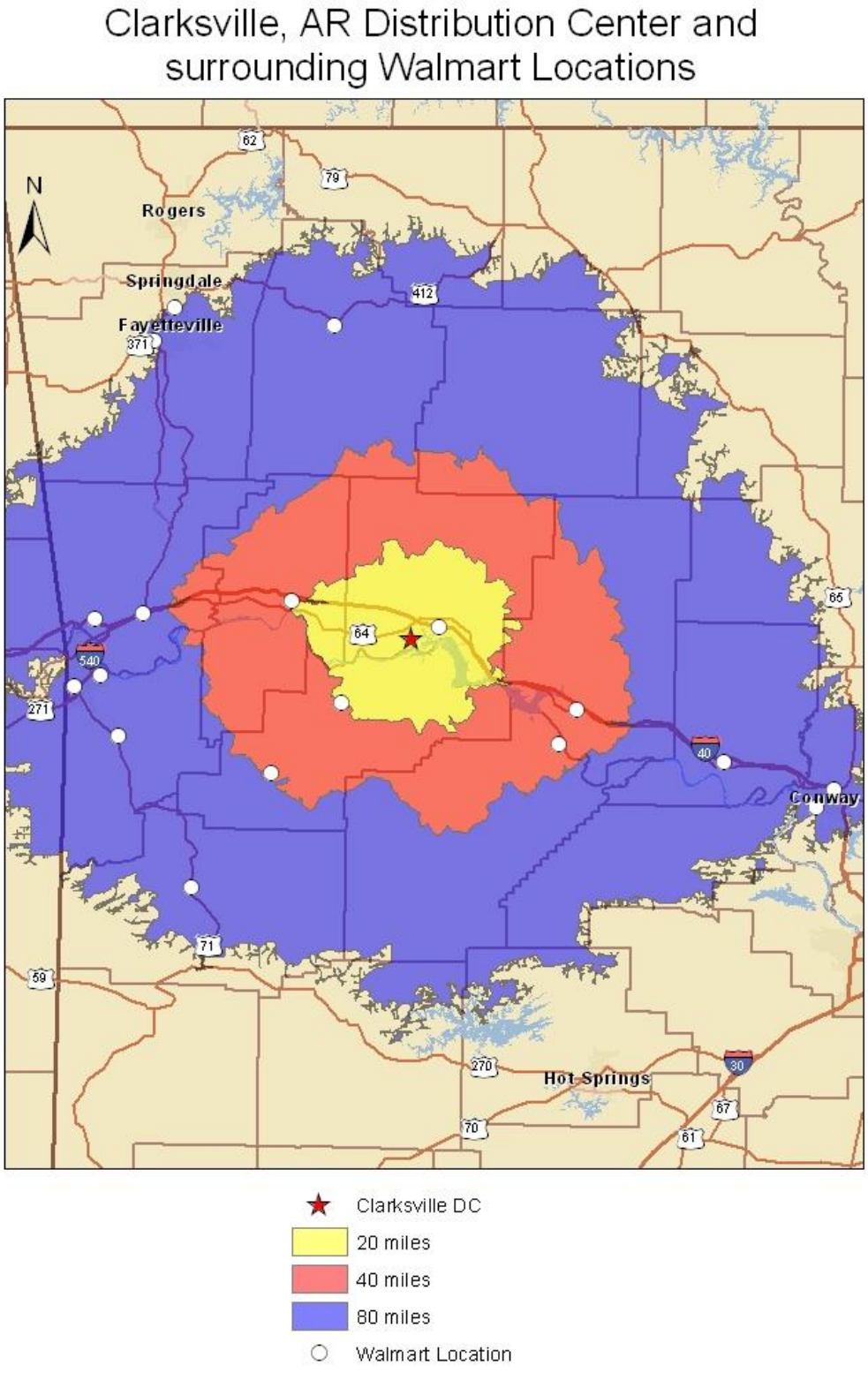
Clarksville, AR Distribution Center and surrounding Walmart Locations
N
Rogers
Springdale
Fayetteville
Conway
Hot Springs
62
79
412
371
64
540
271
65
40
71
59
270
30
67
70
61
Clarksville DC
20 miles
40 miles
80 miles
Walmart Location

Exhibit 2. Load and pallet characteristics of various pallet arrangements of PET and glass water bottles.

	Pallet height (# 12-packs)	Pallet format (# 12-packs wide x long)	Product hangs over pallet edge	Bottles /pallet	Bottles/van	Load Wt.(lbs.)	Pallets/load
Single-Use PET Bottles	7	4x6	No	2,016	60,480	40,170	30
		5x5	No	2,100	63,000	41,767	30
		4x7	Yes	2,352	70,560	46,557	30
		5x6	Yes	2,520	70,560	46,433	28
	9	4x6	No	2,592	72,576	47,710	28
		5x5	No	2,700	72,900	47,854	27
		4x7	Yes	3,024	72,576	47,464	24
		5x6	Yes	3,240	71,280	46,519	22
	11	4x6	No	3,168	72,864	47,584	23
		5x5	No	3,300	72,600	47,355	22
		4x7	Yes	3,696	70,224	45,665	19
		5x6	Yes	3,960	71,280	46,272	18

Exhibit 3. Bottling Machinery Capacity, Size, and Cost

Capacity (bottles per hour)*	Square feet needed	Cost
4,000	405	$155,000
6,000	627	$180,000
10,000	836	$275,000
14,000	1,584	$430,000

*Machinery can function for an average of at least 20 hours per day. Machinery includes purifier, blower, bottler, conveyor, boxer, and shrink wrapper.

Exhibit 4. Water demand by week by product segment for all stores served by the Clarksville, AR distribution center. (Note: The DC data is actual, but the store data is simulated and represents an "average" store served by the distribution center.)

Week	Purified	Store	Spring	Store	Distilled	Store	Carbonated	Store	Artesian	Store	Mineral	Store
9/26/09	1,215,953	17,522	281,805	2,521	47,693	437	22,789	206	9,749	108	3,777	28
10/3/09	1,102,021	14,258	240,806	1,925	41,905	720	21,145	181	10,488	121	3,583	23
10/10/09	1,065,002	8,773	229,045	2,828	37,721	214	19,495	202	9,994	60	3,282	35
10/17/09	988,062	14,419	218,303	1,806	39,660	368	23,438	210	8,786	48	3,916	55
10/24/09	935,402	6,444	213,490	3,217	35,273	397	20,114	152	8,264	84	4,023	46
10/31/09	1,070,735	13,593	245,468	2,922	36,963	388	22,373	200	10,200	125	4,040	42
11/7/09	1,137,184	5,384	258,767	3,492	36,437	399	22,048	264	10,862	108	3,873	34
11/14/09	991,001	8,060	218,020	1,214	30,993	601	21,820	247	8,726	49	3,313	4
11/21/09	995,644	10,238	207,234	3,187	29,182	43	25,971	203	9,246	101	3,696	46
11/28/09	917,557	8,912	207,067	2,242	29,875	355	21,243	229	7,943	87	3,583	32
12/5/09	948,530	7,821	212,249	1,843	30,015	547	20,705	220	9,216	72	3,469	43
12/12/09	959,575	9,159	201,459	1,643	29,703	17	21,371	227	8,542	105	3,335	33
12/19/09	902,568	13,013	183,245	1,579	26,544	503	23,836	315	7,976	124	3,660	23
12/26/09	1,100,593	13,344	203,160	2,417	29,540	209	24,028	246	8,249	120	4,072	11
1/2/10	1,195,212	9,593	226,766	1,671	28,005	49	22,035	172	8,755	47	3,538	40
1/9/10	1,204,984	13,260	227,529	1,297	30,986	227	23,376	287	9,750	74	4,975	30
1/16/10	1,099,458	11,494	225,052	1,392	32,572	456	23,895	225	10,284	100	3,109	44
1/23/10	1,231,163	14,337	254,123	2,064	30,362	232	24,175	267	10,212	137	4,172	44
1/30/10	958,367	7,903	190,439	919	28,031	361	21,439	207	8,247	119	3,308	37
2/6/10	1,051,452	13,317	227,115	3,644	31,041	479	22,709	269	10,868	111	4,218	34
2/13/10	1,071,823	10,908	206,238	2,473	32,504	212	22,907	250	10,745	35	3,839	22
2/20/10	1,084,611	10,632	221,527	2,402	35,893	360	22,891	200	10,772	142	4,397	39
2/27/10	1,176,642	13,023	243,356	2,296	36,996	357	25,113	249	11,524	70	4,309	43
3/6/10	1,250,974	11,947	295,943	2,376	35,750	343	25,370	292	13,165	98	4,593	48
3/13/10	1,275,772	8,008	269,335	2,895	33,988	459	24,568	307	12,791	174	4,841	57
3/20/10	1,100,282	14,857	248,563	2,262	25,475	57	22,013	247	11,577	69	3,581	32
3/27/10	1,273,487	9,081	266,681	3,850	31,472	445	24,690	263	12,889	172	4,269	31
4/3/10	1,415,054	10,344	313,076	3,721	50,709	474	25,432	217	13,753	183	5,334	56
4/10/10	1,614,341	14,779	324,518	2,520	85,404	1,135	26,665	265	13,772	97	5,034	31
4/17/10	1,291,897	16,268	300,893	4,274	68,759	656	24,179	245	10,055	100	4,204	59
4/24/10	1,186,242	17,470	272,477	3,611	62,757	344	24,771	316	10,428	81	3,970	60
5/1/10	1,522,932	17,404	331,543	3,780	79,155	752	27,507	303	14,435	121	4,563	45
5/8/10	1,416,303	13,735	306,359	3,308	78,605	817	25,768	206	13,059	90	3,901	31
5/15/10	1,385,551	18,569	268,284	3,147	66,672	365	26,700	227	13,132	194	3,451	14
5/22/10	1,829,172	19,939	307,220	3,269	80,167	762	30,242	320	13,526	118	3,160	15
5/29/10	1,911,303	20,327	316,581	2,843	82,791	568	32,156	369	14,846	169	3,109	6
6/5/10	1,865,386	20,114	306,685	2,776	68,507	564	30,535	285	16,177	168	3,306	35
6/12/10	2,009,495	22,881	318,517	2,752	54,518	855	31,340	275	18,858	169	3,954	49
6/19/10	2,033,222	20,032	318,733	3,437	53,916	579	30,926	302	16,356	144	3,051	44
6/26/10	1,903,457	17,218	291,087	2,824	45,474	640	29,558	303	15,597	114	2,465	23
7/3/10	1,614,366	10,330	266,369	2,739	47,587	411	28,359	294	15,235	148	2,628	28
7/10/10	1,600,672	17,370	277,802	2,827	62,022	258	30,297	338	18,202	157	3,068	35

Week	Purified	Store	Spring	Store	Distilled	Store	Carbonated	Store	Artesian	Store	Mineral	Store
7/17/10	1,668,871	17,670	304,962	2,476	68,212	156	30,502	296	19,312	182	2,911	25
7/24/10	1,562,909	17,907	302,727	3,318	64,812	337	29,589	271	18,191	179	2,853	12
7/31/10	1,899,312	21,071	349,644	3,469	76,898	927	34,214	331	20,826	202	3,090	39
8/7/10	1,836,826	16,269	330,045	2,833	74,175	809	30,828	381	21,391	133	2,529	12
8/14/10	1,804,854	22,463	331,011	3,153	73,142	605	31,759	281	19,725	154	2,790	17
8/21/10	1,585,034	18,005	338,195	2,957	66,075	460	30,914	341	18,128	175	2,496	35
8/28/10	1,449,906	11,363	392,261	4,497	52,424	417	29,614	325	17,533	211	2,127	1
9/4/10	1,436,312	13,790	323,534	3,017	45,533	402	28,737	250	19,003	190	2,726	28
9/11/10	1,355,926	12,917	332,903	3,612	47,067	603	29,851	384	16,223	125	2,638	24
9/18/10	1,459,093	17,470	303,828	3,187	48,082	412	29,855	326	14,939	141	2,097	2
9/25/10	1,243,298	16,382	271,520	2,993	38,318	618	26,165	233	14,401	181	2,200	34
10/2/10	1,252,752	12,532	275,608	2,270	40,070	661	27,157	255	17,546	177	2,901	21
10/9/10	1,283,214	18,595	289,993	3,091	41,898	560	27,608	261	16,856	161	2,159	18
10/16/10	1,169,684	13,969	266,589	2,786	39,276	444	28,300	264	15,989	125	2,279	-
10/23/10	1,047,857	13,277	252,737	2,739	37,312	670	26,406	276	15,079	184	2,277	26
10/30/10	1,034,598	13,110	257,112	2,841	34,048	230	25,150	333	15,466	119	2,309	14
11/6/10	1,108,518	6,796	275,488	2,847	37,363	544	25,637	155	16,658	182	2,228	22
11/13/10	955,744	10,959	247,763	2,283	33,465	586	25,471	234	13,454	112	2,013	7
11/20/10	996,171	8,366	226,906	2,727	32,003	322	27,614	329	12,277	18	1,802	15
11/27/10	872,619	10,139	215,010	2,395	30,054	624	17,927	190	12,613	160	2,061	19
12/4/10	961,080	9,935	232,918	1,805	32,722	308	18,348	193	15,077	168	1,941	34
12/11/10	911,004	12,505	224,447	1,097	31,575	243	15,413	128	13,309	124	1,874	41
12/18/10	955,357	5,427	210,639	2,897	37,092	232	16,222	158	15,333	123	1,425	-
12/25/10	743,368	9,607	230,441	1,931	29,545	251	19,217	147	11,623	100	1,409	-
1/1/11	943,587	10,142	316,603	3,174	35,216	418	27,817	238	13,174	94	1,749	17
1/8/11	918,381	9,977	285,459	2,710	31,676	227	25,900	325	14,313	99	1,741	26
1/15/11	858,977	3,568	257,624	3,274	34,773	556	25,454	319	12,473	129	1,298	22
1/22/11	825,778	7,896	238,495	1,516	32,736	575	25,056	169	12,069	181	1,661	29
1/29/11	985,388	2,744	336,302	3,959	36,796	-	28,042	215	14,436	132	1,958	25
2/5/11	942,516	7,128	268,895	1,931	33,623	545	27,312	314	16,365	188	1,683	28
2/12/11	1,048,505	7,855	257,366	2,787	39,110	287	27,331	248	16,319	126	1,673	7
2/19/11	996,149	16,841	268,392	2,245	38,543	876	27,769	338	16,476	170	1,738	-
2/26/11	1,124,394	11,003	267,975	3,008	40,703	411	26,625	199	17,233	244	1,650	15
3/5/11	1,107,125	9,982	273,512	2,658	41,284	251	27,057	328	17,515	177	1,667	26
3/12/11	1,251,751	12,865	296,510	2,960	44,927	436	28,062	331	20,576	234	1,738	21
3/19/11	1,282,254	14,015	295,758	3,234	39,552	173	28,214	324	19,070	223	1,474	-
3/26/11	1,105,639	12,453	260,995	1,756	35,547	551	25,709	271	17,614	219	1,568	26
4/2/11	1,351,077	8,974	300,207	3,443	44,306	185	29,781	292	20,497	243	1,474	11
4/9/11	1,370,048	14,401	339,955	3,285	45,123	425	29,237	234	22,698	241	1,694	9
4/16/11	1,173,363	11,816	263,606	3,391	39,418	257	28,156	326	18,165	180	1,353	16
4/23/11	1,092,925	11,871	229,619	2,523	34,646	411	25,706	325	14,834	154	1,496	19
4/30/11	1,123,862	9,795	235,271	2,516	34,673	333	26,563	258	18,490	161	1,397	-
5/7/11	1,422,650	20,014	287,771	2,609	45,270	542	30,022	186	20,608	181	1,320	5
5/14/11	1,203,439	7,607	241,622	2,203	36,316	185	26,546	242	14,700	127	1,100	5
5/21/11	1,384,212	12,701	294,305	4,017	38,255	260	28,362	275	15,299	147	1,364	27

Week	Purified	Store	Spring	Store	Distilled	Store	Carbonated	Store	Artesian	Store	Mineral	Store
5/28/11	1,627,825	16,341	346,637	3,760	56,743	590	31,025	347	17,094	212	1,342	18
6/4/11	1,817,395	16,075	430,029	3,155	68,002	652	33,116	300	20,906	212	1,617	7
6/11/11	1,682,579	15,952	362,938	2,618	67,544	721	31,670	386	15,997	204	1,837	26
6/18/11	1,480,356	17,234	373,407	3,407	64,183	687	32,066	295	15,612	98	1,265	25
6/25/11	1,546,514	18,163	375,702	3,613	65,618	252	32,651	380	15,756	176	1,617	4
7/2/11	1,718,288	15,079	353,947	3,286	64,041	951	33,907	330	16,542	219	1,463	13
7/9/11	1,737,293	12,500	393,032	2,591	76,913	634	31,975	411	17,322	212	1,342	26
7/16/11	1,614,358	19,665	379,614	4,320	76,708	634	33,374	272	13,574	157	1,426	10
7/23/11	1,457,918	11,791	382,397	4,233	73,609	589	31,870	344	13,689	130	1,416	17
7/30/11	1,760,177	24,500	424,774	3,368	87,635	973	34,034	322	15,833	115	1,769	20
8/6/11	1,625,904	18,950	359,784	3,774	88,833	746	31,086	307	16,666	142	1,311	-
8/13/11	1,512,426	18,298	381,903	4,290	93,098	832	31,123	302	15,861	185	1,377	16
8/20/11	1,387,396	16,491	391,444	4,027	89,499	625	29,971	337	13,216	116	1,435	27
8/27/11	1,467,093	15,056	427,249	4,609	79,108	1,092	34,103	260	13,130	128	1,256	25
9/3/11	1,408,398	18,239	405,200	3,890	56,461	493	33,008	343	14,903	125	1,397	17
9/10/11	1,339,129	13,152	359,070	4,069	52,040	413	31,523	332	13,490	140	1,149	13
9/17/11	1,170,178	10,743	340,169	4,192	43,145	283	29,617	260	11,741	38	1,330	19
9/24/11	1,146,157	10,523	356,145	3,595	44,089	215	28,143	301	12,057	161	1,311	3
10/1/11	1,232,573	13,783	374,307	3,705	44,695	432	29,089	334	14,135	84	1,603	23
10/8/11	1,235,104	14,111	372,969	4,332	46,221	493	30,986	317	13,202	125	1,451	17
10/15/11	1,095,881	14,917	327,285	3,561	43,243	216	28,535	287	11,692	115	1,292	12
10/22/11	979,681	12,966	301,962	2,399	38,241	235	27,062	242	9,769	153	1,148	1
10/29/11	1,010,041	10,475	312,785	2,810	38,592	545	29,800	300	10,425	19	1,287	-
11/5/11	1,056,627	9,263	336,958	2,709	39,003	160	26,413	281	12,946	126	1,418	1
11/12/11	938,386	7,996	302,621	3,309	36,364	348	26,128	296	12,022	139	1,209	-
11/19/11	959,073	6,096	275,305	2,641	36,195	202	31,150	366	10,424	152	1,171	12

Exhibit 5. Weekly weather data for the Clarksville, Arkansas region.

Week	Mean High	Mean Mean	Mean Low	Total Precipitation
9/26/09	82.43	73.07	63.71	1.28
10/3/09	80.14	65.21	50.29	0.61
10/10/09	69.00	61.14	53.29	2.85
10/17/09	62.29	55.14	48.00	2.55
10/24/09	66.86	55.50	44.14	1.38
10/31/09	66.43	56.71	47.00	7.70
11/7/09	71.43	58.07	44.71	0.00
11/14/09	70.43	58.64	46.86	0.00
11/21/09	62.57	53.50	44.43	0.60
11/28/09	62.57	50.50	38.43	0.20
12/5/09	49.29	40.36	31.43	2.62
12/12/09	45.86	38.07	30.29	1.43
12/19/09	50.57	41.29	32.00	0.01
12/26/09	53.14	43.93	34.71	6.09
1/2/10	43.43	35.86	28.29	0.03
1/9/10	30.43	22.36	14.29	0.03
1/16/10	49.29	37.43	25.57	1.14
1/23/10	60.86	52.64	44.43	2.19
1/30/10	47.43	38.29	29.14	0.54
2/6/10	44.71	37.50	30.29	1.05
2/13/10	39.29	33.21	27.14	1.66
2/20/10	49.71	38.79	27.86	0.27
2/27/10	49.14	39.86	30.57	0.65
3/6/10	55.00	43.93	32.86	0.00
3/13/10	67.57	55.57	43.57	1.01
3/20/10	64.71	52.64	40.57	0.68
3/27/10	64.29	53.14	42.00	1.59
4/3/10	72.29	59.86	47.43	0.84
4/10/10	77.57	64.71	51.86	1.73
4/17/10	82.86	69.14	55.43	0.00
4/24/10	78.14	66.29	54.43	0.92
5/1/10	77.29	66.07	54.86	0.89
5/8/10	85.00	71.79	58.57	0.11
5/15/10	82.14	72.71	63.29	0.87
5/22/10	82.86	72.93	63.00	1.92
5/29/10	91.43	79.86	68.29	0.47
6/5/10	92.29	81.71	71.14	0.16
6/12/10	94.57	83.07	71.57	0.04
6/19/10	98.71	86.86	75.00	0.14
6/26/10	94.86	87.00	79.14	0.28
7/3/10	91.14	82.64	74.14	0.44
7/10/10	91.86	82.93	74.00	0.03
7/17/10	94.14	84.50	74.86	0.39
7/24/10	95.43	85.79	76.14	0.00

Week	Mean High	Mean Mean	Mean Low	Total Precipitation
7/31/10	93.29	84.71	76.14	0.88
8/7/10	97.43	87.64	77.86	2.29
8/14/10	97.00	88.07	79.14	0.00
8/21/10	95.29	85.71	76.14	0.83
8/28/10	91.14	79.29	67.43	0.00
9/4/10	87.29	77.64	68.00	0.06
9/11/10	89.14	79.36	69.57	0.63
9/18/10	93.43	78.79	64.14	0.20
9/25/10	93.71	80.50	67.29	0.00
10/2/10	81.29	66.57	51.86	0.00
10/9/10	79.57	64.50	49.43	0.00
10/16/10	81.86	66.64	51.43	0.00
10/23/10	80.71	67.79	54.86	0.14
10/30/10	77.00	63.57	50.14	0.53
11/6/10	64.71	54.71	44.71	2.18
11/13/10	71.14	58.14	45.14	0.00
11/20/10	55.86	48.43	41.00	1.24
11/27/10	65.71	56.71	47.71	0.26
12/4/10	52.86	42.86	32.86	3.12
12/11/10	45.86	36.43	27.00	0.00
12/18/10	42.86	35.14	27.43	0.25
12/25/10	57.75	46.00	34.25	0.00
1/1/11	59.00	46.75	34.50	1.02
1/8/11	45.57	38.07	30.57	0.16
1/15/11	35.14	29.71	24.29	0.82
1/22/11	46.00	39.07	32.14	0.48
1/29/11	53.43	44.00	34.57	0.67
2/5/11	48.57	39.21	29.86	2.11
2/12/11	39.14	29.57	20.00	0.29
2/19/11	69.43	59.29	49.14	0.00
2/26/11	68.29	54.93	41.57	0.95
3/5/11	68.29	52.93	37.57	1.73
3/12/11	61.00	50.86	40.71	0.49
3/19/11	64.29	54.29	44.29	0.43
3/26/11	71.00	58.29	45.57	0.00
4/2/11	58.29	50.29	42.29	0.50
4/9/11	80.14	67.43	54.71	0.82
4/16/11	77.29	66.21	55.14	1.85
4/23/11	77.00	66.79	56.57	2.54
4/30/11	78.14	68.43	58.71	6.22
5/7/11	70.43	61.29	52.14	2.60
5/14/11	83.29	72.29	61.29	1.04
5/21/11	78.00	67.71	57.43	0.00
5/28/11	82.00	74.29	66.57	0.91
6/4/11	93.71	82.71	71.71	0.00

Week	Mean High	Mean Mean	Mean Low	Total Precipitation
6/11/11	94.86	83.86	72.86	0.01
6/18/11	95.86	84.93	74.00	0.03
6/25/11	93.71	84.29	74.86	0.00
7/2/11	91.00	82.00	73.00	1.55
7/9/11	92.00	83.50	75.00	1.27
7/16/11	94.57	85.43	76.29	0.47
7/23/11	93.29	85.29	77.29	0.00
7/30/11	93.86	84.93	76.00	0.07
8/6/11	100.00	89.36	78.71	0.24
8/13/11	89.57	80.50	71.43	3.94
8/20/11	89.14	80.21	71.29	1.39
8/27/11	92.29	81.79	71.29	0.61
9/3/11	92.57	82.21	71.86	0.00
9/10/11	82.14	69.21	56.29	0.22
9/17/11	81.14	70.43	59.71	0.41
9/24/11	80.14	69.57	59.00	0.32
10/1/11	81.86	67.29	52.71	0.25
10/8/11	81.86	66.50	51.14	0.00
10/15/11	82.86	69.29	55.71	0.28
10/22/11	67.86	55.43	43.00	0.50
10/29/11	69.29	56.64	44.00	1.96
11/5/11	63.86	53.50	43.14	0.20
11/12/11	67.14	56.36	45.57	0.56
11/19/11	63.86	55.57	47.29	0.96

Exhibit 6. Segments, stock-keeping-units, and retail prices.

Segment	Brand	Size Per Unit	Units Per Package	Price Per Package
spring water	evian	33.8 oz.	1 bottle	$ 1.98
spring water	evian	33.8 oz.	6 bottles	$ 8.98
spring water	Ozarka	16.9 oz.	28 bottles	$ 3.98
spring water	Ozarka	16.9 oz.	12 bottles	$ 2.46
spring water	Ozarka	8 oz.	12 bottles	$ 2.00
spring water	Ozarka	23.7 oz.	6 bottles	$ 1.97
distilled water	Glaceau smart water	20 oz.	6 bottles	$ 5.48
distilled water	Glaceau smart water	33.8 oz.	6 bottles	$ 8.98
distilled water	Glaceau smart water	33.8 oz.	1 bottle	$ 1.58
Artesian water	Fiji	11.15 oz.	6 bottles	$ 4.98
Artesian water	Fiji	16.9 oz.	6 bottles	$ 5.98
Artesian water	Fiji	33.8 oz.	6 bottles	$ 10.48
Artesian water	Fiji	33.8 oz.	1 bottle	$ 1.83
mineral water	Pellegrino	25.3 oz.	1 bottle	$ 1.50
mineral water	Pellegrino	8.45 oz.	6 bottles	$ 4.28
mineral water	Perrier	16.9 oz.	6 bottles	$ 4.97
mineral water	Perrier	25.3 oz.	1 bottle	$ 1.50
mineral water	Perrier	11.15 oz.	4 bottles	$ 2.98
Carbonated	Mixer	8.5 oz.	6 bottles	$ 2.98
Carbonated	Mixer	33.8 oz.	1 bottle	$ 0.98
Carbonated	Schweppes	33.8 oz.	1 bottle	$ 1.00
Carbonated	Mixer seltzer	33.8 oz.	1 bottle	$ 0.98
Carbonated	Mixer seltzer	8.5 oz.	6 bottles	$ 2.98
Carbonated	Vintage seltzer	33.8 oz.	1 bottle	$ 0.64
purified drinking water	Aquafina	16.9 oz.	24 bottles	$ 4.98
purified drinking water	Aquafina	24 oz.	6 bottles	$ 2.98
purified drinking water	Aquafina	16.9 oz.	12 bottles	$ 3.48
purified drinking water	Dasani	16.9 oz.	24 bottles	$ 4.48
purified drinking water	Dasani	12 oz.	8 bottles	$ 2.98
purified drinking water	Great Value	16.9 oz.	35 bottles	$ 3.68
purified drinking water	Nestlé	16.9 oz.	24 bottles	$ 3.98
purified drinking water	Nestlé	8 oz.	12 bottles	$ 1.88
purified drinking water	Nestlé	16.9 oz.	12 bottles	$ 2.48
purified drinking water	Sam's Choice	20 oz.	28 bottles	$ 4.48
purified drinking water	Sam's Choice	10 oz.	15 bottles	$ 2.00

Endnotes

[i] Olson, E.D. "Bottled Water: Pure Drink or Pure Hype?" National Resources Defense Council. April, 1999.

[ii] Rodwan, John G., Jr. "Challenging Circumstances Persist: Future Growth Anticipated." *Bottled Water Reporter*. April/May 2010.

[iii] Fishman, Charles. "Message in a Bottle." *Fast Company*, July 7, 2007. Accessed February 7, 2012, from http://www.fastcompany.com/magazine/117/features-message-in-a-bottle.html.

[iv] The health advantages of bottled water compared with municipal water sources have been the subject of nearly constant debate. Bottled water can come from either municipal water sources or springs. Regardless of the source, the U.S. FDA requires bottled water producers to sanitize and purify their products prior to bottling. But the FDA does not require bottle water producers to identify contaminants, whereas municipalities are required to do so.

[v] Nestle Waters North America, "Environmental Life Cycle Assessment of Drinking Water Alternatives and Consumer Beverage Consumption in North America," 2010. Accessed September 24, 2011, from http://beveragelcafootprint.com/.

[vi] Scott, Lee. "Twenty-First Century Leadership," October 24, 2005. Bentonville, Arkansas.

[vii] Ranade, Sudhanshu. "Satellite Adds Speed to Wal-Mart," *The Hindu Business Line*, July 17, 2005.

[viii] Terreri, April. "Shippers Are Adding Private Fleets to Their Transportation Mix," *World Trade*, February 1, 2006, p. 100.

[ix]Rand Waddoups. Personal interview. July 6, 2011. Bentonville, Arkansas.

[x] Barbaro, M. "The Energy Challenge: Wal-Mart Puts Some Muscle Behind Power-Sipping Bulbs," *The New York Times*, January 2, 2007. Available at http://www.nytimes.com/2007/01/02/business/02bulb.html.

[xi] Scott, op. cit.

[xii] Fishman, op. cit.

[xiii] See http://www.foodandwaterwatch.org/pressreleases/fiji-water-bottling-the-myth-of-sustainability/. Fiji Water responded vigorously to these attacks on its sustainability. See for example http://www.environmentalleader.com/2007/11/07/fiji-water-to-go-carbon-negative/.

[xiv] Fishman, op. cit.

[xv] Environmental Working Group, "Bottled Water Quality Investigation: 10 Major Brands, 38 Pollutants," 2008. Available at: http://www.ewg.org/book/export/html/27010.

[xvi] Natural Resources Defense Council, "Bottled Water: Pure Drink or Pure Hype?" 2008: Available at; http://www.nrdc.org/water/drinking/qbw.asp..

[xvii] Ibid.

[xviii] Gashler, K., "Thirst for Bottled Water Unleashes Flood of Environmental Concerns" *Ithaca Journal*, June 7, 2007. Also available at: http://usatoday30.usatoday.com/news/nation/environment/2008-06-07-bottled-water_N.htm.